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IN THREE SECTIONS

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N. A. C. A. LIBRARY

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EDITORIAL DEPARTMENT NOTE

In this issue of our Bulletin we are publishing an excellent paper on cost accounting in the manufacture of soap. Enough explanation is given of the process of making soap to enable the reader to get a good picture of the accounting problems involved. The system described should be simple to operate, yet should give management all the necessary information.

P. C. Merrill, the author of the first paper, was graduated from Stanford University in 1919 and from Massachusetts Institute of Technology in 1922. He was immediately employed by the Los Angeles Soap Company as chemical engineer and later became manager of production. In 1928 he was made assistant general manager, which position he now holds. This paper was delivered before our Los Angeles Chapter.

The second paper deals with the preparation and cost of Anti-Venin serum. It is a very interesting paper from the standpoint of the manufacturing processes discussed as well as from the accounting aspects. Here is a discussion of cost accounting problems closely connected with the problem of caring for a group of venomous snakes and venom-inoculated horses. A very interesting paper.

Richard B. St. Maur, the author of the second paper, upon leaving high school entered the services of the H. K. Mulford Company and worked in the Pharmaceutical Laboratories for more than five years before taking up the work of the development of a cost finding system, in 1914. Mr. St. Maur was a member of the Committee of the American Drug Manufacturers' Association, which, in 1927, published the "Uniform Cost Accounting Manual" for the industry, having written several chapters including the one on Serum Costs.

Upon consolidation of the H. K. Mulford Company with Sharp and Dohme of Baltimore in 1929 under the name of Sharp and Dohme, Inc., he has continued as Cost Accountant in charge of pharmaceutical and biological costs.

He was present at the organization meeting of our Philadelphia Chapter, and his certificate, which bears the signature of our first National President, J. Lee Nicholson, is dated July 15, 1920.

The third paper is brief but full of excellent ideas relative to the application of distribution costs in the pharmaceutical industry. John N. Harvard, the author of this paper has been connected with the R. J. Strasenburgh Company, Pharmaceutical Chemists, for the past twenty years and now occupies the position of Secretary of that company.

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COST ACCOUNTANTS
July 15, 1933

COSTS IN THE SOAP INDUSTRY

By Paul C. Merrill,
Assistant General Manager,
Los Angeles Soap Company, Los Angeles, Cal.

IT IS with considerable hesitancy that I, a chemical engineer, talk to you of the cost accounting profession on the subject which you have made your life study. Inasmuch as I have never enjoyed the honor before of giving or even of hearing a talk on this subject, I am at a complete loss as to how it *should* be done. I see your Secretary has put me down as a "one-job man"—I wish it were true—that is *tonight* I do—then perhaps, I would be better prepared to keep strictly to my subject—"How Factory Costs are Figured in Our Soap Plant." Frankly, I am really more interested in how soap is made, what raw materials are used and how they affect the quality of the finished product; and so I hope you will bear with me if I touch on the things that interest me and weave them into the subject of factory costs.

Raw Materials—Saponifiable Oils

The most important class of raw materials which enters into the manufacture of soap is the saponifiable fats and oils. By the term "saponifiable" we mean, of course, fats and oils which are convertible into soap by caustic soda or other suitable alkali. The number of saponifiable fats and oils which occur in nature is legion.

While most of the fats and oils we use for making soap are of an inedible nature, many could be coverted into edible oil by a simple refining process; cottonseed oil, cocoanut oil and sesame seed oil, for instance.

Others are of an inedible nature merely because the government places such a high tariff on them as edible oils that we are obliged to use denaturants before importing them into this country for use in the soap kettle. Soya bean oil and olive oil fall in this class.

Cocoanut Oil

By far the most important raw material from our standpoint is cocoanut oil. Our consumption of cocoanut oil runs around 10,000

tons per year. In order to insure ourselves of a high-grade oil we have formed a subsidiary company, known as the Copra Oil & Meal Co., Ltd., the sole purpose of which is to purchase high-grade copra in the world market and ship it to Los Angeles harbor. The cocoanut oil is pressed out there in a very modern, continuous process, oil mill. Our copra mill has double the capacity of our present needs or approximately two tank cars of cocoanut oil every 24 hours. The quality of oil turned out by this modern mill is extremely high and sells in the open market at a premium over imported oil for all sorts of uses, ranging from soap making to the manufacture of nut margarine. Except for shutdowns for repairs, this plant has been operating continuously since its erection three years ago.

Vegetable Oils

From our standpoint the next important class of saponifiable oils is the vegetable oils. This covers a wide range of items, some of which I have already mentioned. Cottonseed oil comes to us from our own California inland valleys, from Texas and the southern states. Palm oil from Sumatra is used in preference to the lower grade African palm oil for the manufacture of our toilet soaps. Olive oil we are obliged to buy in Spain and Italy because of the lower price. A group of semi-drying vegetable oils, which, when properly blended have certain indispensable qualities in the manufacturing of a modern soap are sunflower seed oil from Siberia, sesame seed oil from China, soya bean oil from Japan and corn oil from our own corn belt.

Tallow

We are less concerned with a third group of saponifiable material commonly known as tallow. This appears on the market in many different grades, ranging from the edible types such as lard, down to burnt grease drippings from commercial kitchens. It is usually obtained by boiling out or rendering the fat from packing house scraps. Small independent rendering plants obtain their scraps from butcher shops. Tallow originally was the nucleus of the soap industry of this country. Old-fashioned soaps contained a large percentage of tallow and even today cheap soaps sold in soft water districts or to steam laundries will contain 90% to

100% tallow. Our company has shown the Pacific Coast and the Middle West that modern soaps for household use need only a small percentage of beef and mutton tallow.

The art of blending nature's generous supply of saponifiable oils for a finished soap of universal usefulness is perhaps the most fascinating field of the entire industry.

For our purpose of setting up factory costs we will leave the details of purchasing and blending our oils for our numerous finished products to the proper experts. The chemist supplies us with the correct formula for each blend of oils and the purchasing department submits the cost of each saponifiable fat or oil correctly weighed out of the tank cars into its proper tank in our tank farm. From this starting point it is a simple matter to figure the average cost of each blend of oils.

The reason for going so much into details on the subject of saponifiable oils is because they form the bulk of the factory cost of each finished product. Last year they represented 55% of the total factory cost of goods manufactured. Three years ago they represented two-thirds of the cost and with a return to normal commodity prices will again attain this higher percentage.

Prorated Manufacturing Expenses

The oils also form the basis upon which we prorate our manufacturing expenses. A number of years ago we made a careful check on the two most important items—one with an oil content of 45% and the other with an oil content of 90% and discovered that the ratio of fat content per cwt. represented very accurately the ratio of manufacturing expenses chargeable against these two items.

Factory Cost Per Cwt. Oil

This average cost per cwt. of oil is based on previous experience and subject to re-check every three months. It represents, of course, the total manufacturing expense for the quarter, per cwt. of all fats and oils converted into finished product. Its variation from year to year is only slight—ranging from $1.40 to $1.60 per cwt. Due to this slight variation and further due to the fact that it represents only 15% to 20% of the finished product factory cost, we consider this simplified method of estimating the propor-

tion of the manufacturing cost each product should bear, is sufficiently accurate for our factory cost calculations.

Manufacturing Expenses

You are possibly interested in the items which combine to make up this manufacturing expense—

1. Factory Wages 44%
2. Factory Salaries .....12%—Foremen and Superintendent
3. Depreciation—Bldgs. & Equipment .....12%—(10% Equipment) Government (2-5% Buildings) Regulations
4. Administration Charges 8%—Purchasing Agent, Timekeeper, Auditing Department
5. Plant Repairs and Renewals 5%
6. Taxes 5%
7. Fuel 4%
8. Insurance ..... 2%—(Fire — Appraisal up to date. Group life, Compensation)
9. Miscellaneous 8%

We feel that everything that could conceivably be charged against the operating of the factory is included in this list.

Wages—Bonus Plan

The factory wages are based entirely on hourly wage rates. The wage rates have not been changed other than to be increased for the past 15 years. We have no piece-work or factory incentive plan. All employees of our company participate in a profit-sharing plan which is based on the net earnings for the year and prorated according to length of employment and wage or salary earned per annum. The first requisite of this plan is that the employee shall have been steadily employed for a period of two years. The undesirable worker will automatically eliminate himself in that length of time. The original profit-sharing schedule paid 2% of an employee's annual earnings for each year of service up to five years. Thus a man of five years' employment earning $2,500 per year was paid 10% or $250 in cash at Christmas. The rate of increase above five years' employment dropped to ½% per year of additional

service. The same employee would have to work 20 additional years to double his bonus at the same yearly salary. This plan has cut down our labor turnover tremendously. Our foremen have a continuous service record ranging from a minimum of 15 years to as high as 45 years. Since the plan was first adopted our board of directors has never failed to pay us a bonus at least equal to the original schedule and in good years has increased the rate 50%. The board feels that the employees through their earnest efforts for the company have rightfully earned this share of the company's profits and needless to say a feeling of good will and desire to co-operate to the fullest extent permeates the entire organization in a way that no incentive plan ever could.

Factory Costs

The manufacturing department is the simplest to operate of any soap making plant we know of. True, the plant just grew up and consequently was never properly laid out for its present tonnage, but its simplicity and ease of operation is outstanding and so it is with the way we figure our factory costs. The idea is to make everything as simple as possible.

Consider the item White King Bar Soap, (Schedule I, p. 1584). The most compact form of finished product is a frame. The hot curd soap is pumped from the kettle through a pipe line into a mixer or crutcher. Each kettle is charged with 50,000 lbs. of mixed oils accurately weighed. An average of 109 frames can be made from this kettle of soap so each frame must be charged with 460 lbs. of mixed oils which the purchasing department informs us costs $3.10 per cwt.

Item No. 1—460 lbs. of Oil @ $3.10 — $14.26.

Last year's check-up on manufacturing costs per cwt. of fat shows that this item is climbing slightly, due to decreased production from $1.40 in the first quarter to $1.50 per cwt. the last quarter. We go into conference with the sales department and decide that for the first quarter of this year we can expect a tonnage no greater than the fourth quarter of last year. Therefore, we estimate our manufacturing cost for the first quarter of 1933 at $1.50.

Item No. 2—Mfg. Cost—460 lbs. of Oil @ $1.50 per cwt. — $6.90.

The oils in Item No. 1 are saponifiable oils, therefore, it takes alkali to convert them into soap—in this case caustic soda. Caustic soda is bought on a yearly contract and costs approximately $2.75 per cwt., solid basis, delivered. The chemical laboratory can tell us accurately the *theoretical* amount needed for this job and by analysis of the waste lyes they can determine the excess the soap-maker uses. We are not content with this, so we run a caustic soda balance on the plant every three months. This tells us in a practical way how close the chemist is with his analyses. This all shows us that it takes 110 lbs. to make a frame of White King Bar Soap.

Item No. 3—110 lbs. of Caustic Soda @ $2.75 per cwt. — $3.03.

The procedure of converting oils into a finished soap involves several boilings with caustic soda, water and salt. These boilings are called changes because when the salt is finally added the soap curds and leaves a clear lye underneath which is drawn off or changed. The salt used in these changes is weighed and the weight recorded in the soap-maker's record. From this record we learn that each frame of White King Bar Soap must be charged with 160 lbs. of salt.

Item No. 4—160 lbs. of Salt @ 35¢ per cwt. — 56¢.

If you should stand and watch the mixing of a frame of White King Bar Soap you would see one man weigh out on a portable platform scale definite amounts of two hot liquids and pour them slowly into the mixing mass. He is putting in

Item No. 5—50 lbs. of Sal Soda @ 50¢ per cwt. — 25¢.

One sack of soda ash costing $3 makes 600 lbs. of hot sal soda. You are all undoubtedly familiar with the detergent value of sal soda. It is never incorporated in soap with the idea of cheapening the product because it really has properties which improve the washing qualities without any harm to fabrics, if not added in too large an amount.

This statement also holds true for liquid silicate of soda or water glass which is the other hot liquid to be added to our frame of soap. Silicate of soda is bought in liquid form on the basis of anhydrous silicate content and for our purpose figures at 75¢ per cwt. This gives us

Item No. 6—320 lbs. of Silicate Solution @ 75¢ per cwt. — $2.40.

We now have arrived at the subject of soap perfumes. The public today demands that all fatty odors in soap be covered up regardless of how cheap the product may be. These perfume materials both man-made and natural come from all parts of the world and require as much skill in blending as the soap oils. The procedure for arriving at the cost of any one blend is quite analagous to that outlined for the saponifiable oil mixtures. So we now measure into our frame of soap.

Item No. 7—1 lb. of Perfume @ 36¢ per lb. = 36¢.

The added ingredients are thoroughly mixed into the curd soap and dropped into the empty frame below the crutcher. Every tenth frame is weighed before and after filling to determine the average weight per frame of the soap mixture. This average weight is recorded in the soap-making record and used as a check against the average weight used in the cost set-up. We are now using 1,045 lbs per frame.

During the manufacturing process, glycerine was removed from the oil. We know from our quarterly figures that 100 lbs. of this oil produces about 8.7 lbs. of 88% candle crude glycerine valued at 3¾¢ per lb. Therefore, this frame of soap is given credit for 40 lbs. of glycerine at 3¾¢ or $1.50.

The net cost of 1,045 lbs. of White King Bar Soap is now arrived at and amounts to $27.76. From this we get a factory cost per cwt. of $2.52.

Please note *all* the manufacturing cost has been added. So when we get to cutting this frame into 8½-ounce bars we merely have to calculate the weight of soap per case at the factory cost per cwt., add the cost of wrappers and cost of case and we have the factory cost per case of 100—8½-ounce bars, stacked in the warehouse waiting for delivery.

White King Bar Soap—100s—8½ oz.

55 lbs. of Soap @ $2.52.....	$1.39
100 Wrappers @ 69¢ per M.....	0.07
1 Case @ 6¢	0.06
Factory Cost per Case.....	$1.52

There are two points still to be explained with reference to this item. The first is that there are scraps trimmed off at the cutting

table. How do we account for scraps? I have deliberately picked the easiest example in this respect. The scraps can all be melted up and recast into frames of White King Bar Soap so the scraps are eliminated. In cases where the scraps must be thrown back into the kettle we deduct the weight of scraps per frame from the net weight of soap in the frame and give credit for whatever can be salvaged, usually only the oil content of the scraps.

The second point to be discussed is the weight of soap per case. You will note that 100 8½-ounce bars should weigh only 850 ounces or 53⅛ lbs. In the cutting room we have a small scale. The operator weighs three bars from the top, center and bottom of the first, middle and last frames of a cutting run or batch. The averaged figures are what we base our over-weight charges on.

From our quarterly inventory sheets we can obtain the necessary inventory corrections for running an oil balance on the oil weighed for White King Bar Soap and pumped to the soap kettle against the amount of oil charged to the cases of 8½ oz.—100s White King Bar Soap turned out. This check-up is quite practical in this instance, but some soaps figured in frames in a similar manner will be cut up into a score of different weights and shapes to produce as many different finished product items. Each one of these items will have a different factory cost and a different oil content per case and a check-up by oil balance does not tell us where the trouble might be if the weight of finished product is in error. Here we are forced to rely on the accuracy of the cutting table operator.

We have already mentioned soaps with oil contents running around 90%. These are the artificially dried soaps which run through the soap driers in flake form. These dried flakes are turned into three forms of finished product—the flakes themselves may be packaged and sold, they may be ground into granules or they may be milled into bars of toilet soap.

All soaps run through the driers are sampled as they leave the drier and analyzed for oil content. This is our control for obtaining a uniform oil content in the finished product. In the case of toilet soaps we need this control for processing purposes as well as for economic reasons. The soap mills can only successfully turn out a salable cake of toilet soap within a very narrow moisture content range which is the same thing as saying within a narrow

range of oil content. Our constant checking of milled toilet soap gives a very accurate average on the oil content of the finished cake; 100 lbs. of Mission Bell Toilet Soap contains 86 lbs. of nut and vegetable oils. But turning to our quarterly oil balance we find 88 lbs. of oil was actually weighed out in the Raw Materials Department for every 100 lbs. of finished product. We know, therefore, that there has been a shrinkage of slightly over 2% from raw material to finished product. This shrinkage is found in all our kettle boiled soaps and is due to the fact that the soap is slightly soluble in the waste lyes run off after each change. This shrinkage was automatically taken care of in the case of the White King Bar Soap in frames by keeping an accurate account of the average number of frames per 50,000 lb. batch of oil weighed out.

Let us now consider Mission Bell Toilet Soap which you will find listed on Schedule I:

100 lbs. of finished product consumes—

1. 88 lbs. of Oil @ 3⅛¢ per cwt.....	$2.75
2. Mfg. Cost—.88 x 1.50 per cwt.....	1.32
3. 18 lbs. of Caustic Soda @ $2.75 per cwt...	.50
4. 17 lbs. of Salt @ 35¢ per cwt.....	.06

We use a minimum amount of caustic soda and salt in the manufacturing of fine toilet soap.

In the case of a milled toilet soap the quantity and quality of perfumes add materially to the cost of the finished product. To insure a uniform perfume it is necessary to weigh the dried flakes into a dry mixing machine or amalgamator and add a weighed amount of perfume. To each 100 lbs. of Mission Bell flakes in the amalgamator is added

5. 0.735 lbs. Perfume @ $2.35/lb. $1.73

It probably seems a little strange that we should handle decimals of pounds. Actually we do not. Perfumes as fine as those put into Mission Bell, White King Toilet Soap or Chandu Toilet Soap are originally blended by a chemist who is in the habit of working in metric units. He recommends that we measure 360 cc. of Mission Bell Perfume into every 100 lbs. of soap flakes. This we actually do, making our conversion into pounds for the cost records from

the additional data supplied by the chemist that 490 cc. of Mission Bell Perfume weighs one pound.

The improvements in milling and plodding equipment have been so rapid within the last ten years that we are not able to fully depreciate it on the books before new and more modern equipment is installed. To take care of this situation we have added a flat rate charge against toilet soaps of 25¢ per cwt. until such time as the excessive depreciation charges have been absorbed. This gives us

6. Milling charge—25¢

We are now ready to total and credit the glycerine. The total is $6.61.

6 lbs. of Glycerine @ 3¾¢ — 22¢

The factory cost per cwt. is then $6.39.

The soap passes from the amalgamator through our new mills into the preliminary and secondary plodder where high pressure augur screws force the soap out into a long continuous bar. The cutting at this point is done volumetrically. The long bar cut off by hand with a putty knife passes through a plate nozzle of very accurate dimensions. The soap causes very little wear on this steel plate. The hand-cut bar passes through a header strung with steel wires at accurately measured distances. We have very little trouble with changes in dimension at this point. Nevertheless daily tests are made and recorded of the weights of the bars passing through this header. Any variation is taken care of immediately.

Mission Bell Toilet Soap is cut to weigh 3¾ ounces—pressed, wrapped and packed 100 bars per case. The factory cost per case is therefore, as shown on Schedule I:

23½ lbs. of Soap @ $6.39	$1.50
Cardboard Inserts @ 39¢	0.04
Wraps @ $12.01	0.13
Case Layer	0.01
Case	0.05
Factory Cost per Case	$1.73

I am tempted at this time to digress into the subject of Perfumes. I imagine you would find it rather difficult to get a perfumer or cosmetic manufacturer to divulge how he figures the

costs of his pet line of goods, used by all the stars of Hollywood. I have been given permission to read to you this evening a toilet soap perfume formula used by us three or four years ago. Not with the idea that you will remember anything about it, but just to show you the type of service rendered by our technical staff on a small but very important phase of our industry. The perfumer must have, first of all a very keen nose and second he must have had plenty of experience. He has an idea on a knockout, a perfume that will have freshness, be pleasing to the public, and absolutely cover the fatty odor of the soap base. Not a definite flower type, but a bouquet. He begins his work. This mixture should have:—

20 parts	Bergamot—Italian	Freshness
15 "	Lavender—French	"
10 "	Geranium—Reunion	Good Soap Odor
16 "	Geraniol—Isolate	Blender
3 "	Civette—Tincture Abyssinia	Background
2 "	Diphenyl Methane—Aromatic	Covering Power
2/3 "	Musc—Synthetic	Popularity Note
8 "	Bois de Rose—Cayenne	Lift
4 "	Benzyl Acetate—Chemical	"
1 "	Vanillin—Familiar	Sweetness
3 "	Petitgrains—S. A.	Bitter Orange Note
1/3 "	Ionone—Powerful	Violet Note
2 "	Lemongrass—Madagascar	Lemon Note
8 "	Sandalwood—East Indies	Rich Oriental Effect
1 "	Cloves—Zanzibar	Spicy Effect
4 "	Patchouly—Penang	Heavy Effect
1 "	Vetivert—Java	Oriental Effect
100 parts		

He takes his creation to the cost accountant and they begin checking off the items. Alas! the mixture is too expensive for soap use; but the perfumer is not disheartened—he has an idea if he cuts down a little on Sandalwood and adds more Geraniol perhaps the effect will be favorable and surely it will bring the price down. He tries again and again, finally he succeeds, the factory goes into production, the sales force have become enthused and gradually

the public is equally enthused. The sales mount higher and higher, radio advertising pyramids the orders, but nobody remembers the perfumer—he is still thinking about that same formula—perhaps he should cut down a little on the Civette and put back some of the Sandalwood he took out. He could do that without changing the cost. The sure sign of a good perfumer—completely absorbed in his work and ever pondering on the perfect formula.

Another phase of costs is our ever increasing "Cost Estimate Bible." It now contains about 600 pages of different items which have been figured over a period of three years but have never been important enough to get on the regular list.

Toilet soap salesman Black drops in with a red hot idea from the Hollywood Cosmetic, Inc. They want to complete their line of cosmetics and shampoos with a turtle oil soap. "My God! what next, do they expect the public to fall for that bunk?" I ask. "Sure thing," says Black, "Turtle oil is all the rage for the complexion. Why not a turtle oil soap?" "O.K. Big Boy, but where do we get the turtle oil?" "Oh, they will furnish that but, say, can't you figure a cost for me now so I can 'phone them an answer first thing in the morning?" "Wait a minute, old man, better try this out in the laboratory first." "Get us a sample of turtle oil and their ideas on a perfume. Find out if it is to be a wrapped bar and if they are willing to gamble $50 on a set of plates for the press."

After ten days' or two weeks' time everything is settled. We are to run a 200 gross trial order of turtle oil soap for the Hollywood Cosmetic, Inc. They furnish the turtle oil, the plates and the outside wrapper; we do the rest. The cost estimate was based on Mission Bell Toilet Soap experience. The perfume cost happens to be the same so the factory cost per cwt. is identical with Mission Bell. From this point on we figure—per gross—

1. 33¾ lbs. of Soap @ $6.39	$2.16
2. Cardboard Inserts	.06
3. Inside Wraps @ 80¢/M	.02
4. Case Layers	.02
5. Case—Estimated	.07
6. Change over	.05
	$2.38

Black can sell for 40% over factory cost and everybody is happy. But turtle oil soap is probably just another page in the "Cost Estimate Bible" after the initial order goes out because some bright chap will start a fad in cosmetic oil for the fickle public of avocado oil by reminding Miss Los Angeles that after all turtles are scavengers and reptiles and who would anoint her skin with snake oil?

Regardless of whether turtle oil soap will run through the plant only once or become one of the regular items, the first run is considered very important. It is an experimental run, not only from the production standpoint, but from the standpoint of costs. Somebody is appointed to watch this run from start to finish and with the aid of the foremen of the departments involved gather all the necessary figures on the manufacturing expenses. A record is made of this run and filed away for reference. The facts are checked carefully with the estimate and the estimate revised before the cost is released to the auditing department. Furthermore, any change in procedure calls for a recheck and a new cost figure, if there is a change. This in general is the transition through which every regular item goes; the original experimental run and an occasional experimental run thereafter when changes are made in production methods.

Just one more point and I am through. That is the balance sheet of factory cost operations by which our cost efforts are judged. As you may have surmised from my talk, we take inventory of all finished goods and raw materials quarterly. The purchasing department uses the raw materials' inventory plus current prices to figure the average cost on the estimated amount of the various oils to be consumed for the ensuing three months. I receive a copy of these average oil costs and set up the factory costs on about 300 regular items, let us say, effective Jan. 1, 1933. These figures I now submit to the auditing department which credits the factory with all finished goods sent out from the warehouse during the ensuing quarter at the figured costs. Then at the end of the quarter when inventory is again taken, they charge me with the Jan. 1 inventory and credit the March 31 inventory to make the inventory correction and finally charge me with all raw material purchases received. The balance thus obtained represents the cost department's estimated manufacturing expense and theo-

retically should be equal to the actual manufacturing expenses. So below this balance the auditing department itemizes the manufacturing expenses which actually occurred during January, February and March and totals. This itemized total is compared with the balance. We are in the clear if the factory costs *figured* show a light net gain over the actual experience. But, if the actual exceeds our calculated balance, the cost figures are on the spot. The gain or loss over actual experience is made cumulative until the year is completed. Last year we had a gain of 7% on the actual manufacturing expenses or about 1¼% on the goods manufactured. This is about the average for the last five years.

So far I have been fortunate enough not to be on the spot with those who scan these quarterly balance sheets of factory profit and loss; but *that* time may come when least expected, therefore, I welcome an opportunity to discuss with you this evening the weaknesses of this system, of which I realize there are many, so that I may be better prepared to intelligently offer my firm constructive criticism towards any improvements that could be made.

SCHEDULE I

ONE FRAME WHITE KING BAR SOAP—1,045 LBS.

Item #1. OILS	—460 Lbs.	@	$3.10	per	Cwt.	$14.26
2. Mfg. Cost	—460 "	@	1.50	"	"	6.90
3. Caustic Soda	—110 "	@	2.75	"	"	3.03
4. Salt	—160 "	@	.35	"	"	0.56
5. Salsoda	— 50 "	@	.50	"	"	0.25
6. Silicate	—320 "	@	.75	"	"	2.40
7. Perfume	— 1 Lb.	@	.36	"	Lb.	0.36
						$27.76
CREDIT—Glycerine	— 40 Lbs.	@	$3.75	per	Cwt.	1.50
						$26.26
Factory Cost Per Cwt.						$2.52

WHITE KING BAR SOAP—100s—8½-OZ.

Item #1. Soap—55 Lbs. @ $2.52 per cwt.	$1.39
2. Wraps—100 @ 69¢ per M.	.07
3. Case	.06
Factory Cost Per Case	$1.52

MISSION BELL TOILET SOAP—100 LBS. FINISHED PRODUCT

Item #1. Oils	—	88 Lbs.	@	$3.125	per cwt.	...	$2.75
2. Mfg. Cost	—	88 "	@	1.50	" "	...	1.32
3. Caustic Soda	—	18 "	@	2.75	" "	...	0.50
4. Salt	—	17 "	@	.35	" "	...	0.06
5. Perfume	—0.735	"	@	2.35	" "	...	1.73
6. Milling Charge						.....	0.25
							$6.61
CREDIT—Glycerine	—6 Lbs.	@	$3.75	per cwt.		.....	.22
Factory Cost Per Cwt.						.....	$6.39

MISSION BELL TOILET SOAP—100s—3¾ OZ.

Item #1. Soap—23½ Lbs.	@	$6.39	per cwt.	.....	$1.50
2. Inserts	@	.39	" M	.....	.04
3. Wraps	@	$12.01	" M	.....	.13
4. Case Layers				.....	.01
5. Case				.....	.05
Factory Cost Per Case				.....	$1.73

TURTLE OIL SOAP—144s—3¾ OZ.

Item #1. Soap—33¾ Lbs.	@	$6.39	per cwt.	.....	$2.16
2. Inserts				.....	.06
3. Inside Wraps				.....	.02
4. Case Layers				.....	.02
5. Case—Estimated				.....	.07
6. Change Over				.....	.05
Factory Cost Per Case				.....	$2.38

SCHEDULE I

SERUM PRODUCTION IN THE BIOLOGICAL INDUSTRY AND THE METHOD USED TO DETERMINE COSTS

By Richard B. St. Maur, Cost Accountant,

Mulford Laboratories of Sharp & Dohme, Philadelphia, Pa.

"FOR the conservation of life" was a slogan coined by these pioneer producers of biological products. Everyone is interested when the subject of "life conservation" is discussed and yet few actually understand the intricate processes involved in the production of biologicals and the difficulties in accurate cost finding in this industry. The writer has undertaken this paper with the hope that those who read may get some idea, without too much detail, of serum production in general and the method of determining serum costs. Snake-bite serum known as "Anti Venin" is taken as an example.

The method here described is applied by the Mulford Laboratories of Sharp & Dohme, with very slight changes affecting tests, doses, periods of preparation, etc., to serum production for the treatment of such familiar diseases as diphtheria, tetanus, scarlet fever, pneumonia and others. Anti Venin has been selected because of the general interest so frequently displayed in published references to this serum during the last two or three years.

Process of Production

The first step is the selection of horses. Only animals known to be in perfect condition by inspection and test are accepted. When received each horse is given an identification number which it retains as long as the animal is under treatment. These horses are placed in quarantine for ten days under observation and tests. At the end of the quarantine period a veterinarian inspects them and only those horses that have passed the necessary tests are used. The same procedure is followed with horses for the production of anti-bacterial serums and anti-toxins.

Having been passed for Anti-Venin production the horses are transferred to the stables and are ready for inoculation, which means the injection, subcutaneously, in the side of the neck, with doses of venom of graduated strength. These doses are prepared

from venom extracted from live snakes, according to the species for which protection is desired. The venom is diluted with saline solution in a sterile manner and the injections are made twice a week over a period of from six to nine months, with the dosage gradually increasing in strength, or until the dose is about one thousand times as strong as the initial dose, and immunity is established.

Starting at about twelve weeks after the first injection, trial bleedings are taken and tests made to determine the potency of the serum. The serum is the clear aqueous portion of the blood known as plasma; the corpuscles, etc., having been eliminated by a special process which makes use of the coagulation or clotting of the blood. When the tests on the trial bleedings show that the serum has reached the required strength, regular bleedings are taken from the horse and the actual process of serum production is under way.

Each bleeding is identified by the horse number and a letter. For example, the fifth bleeding from horse #612 would be #612-E, and samples of the plasma or serum are taken and tested for each lot of blood drawn.

When approximately 300 liters (about 660 pints) of plasma of the desired potency are available, a production number is assigned and all of the material, having been checked as to identity, tests, etc., is mixed together. A sample of this mixture is taken and further tests made as to the potency, after which the serum is concentrated. Tests are made on small animals, such as mice, rats, guinea pigs, rabbits; and also on pigeons. All during this process, which consumes several months after the horses become productive, the material is handled under sterile conditions at all times to prevent contamination.

The concentrated serum, having passed all laboratory tests, is ready for packaging. It is transported to the filling rooms which are air conditioned and temperature controlled. The air is purified by passing through filters, then through air conditioning machines to regulate moisture content, and finally is automatically adjusted to a definite temperature. The syringes or vials into which the material is placed have been washed with purified water, then by distilled water and finally sterilized by heat. The sterile containers are then filled with the sterile product in the above men-

tioned filling rooms, under sterile conditions and to finally establish the purity of the finished product, samples of the product in filled containers are given safety and sterility tests. Having passed these, the product is ready for packaging for the market.

Determining the Costs

Two costs are established for the bulk product; the first for the plasma or unmixed serum, and the second for the finished bulk product.

Three units or centers are maintained which we will identify as #1, #2 and #3.

Center #1 represents the center in which the snakes are housed, venom extracted and the doses prepared (separate centers are maintained for the production of toxins and antigens used as doses in the preparation of other serums).

Center #2 represents the stables for productive horses. The expenses incurred from the time the horse is received and placed in quarantine, until the blood is drawn, are accumulated in this center.

Center #3. The expenses of this center cover the treatment of the serum from the time that center #2 turns over the blood until the finished product is available.

The expenses for each center are accumulated in the cost ledger and at the end of the month are distributed (on a basis which is hereafter explained) to the cost of the serum produced.

A separate sheet for each type of serum is kept in the "process" ledger, (See Form I).

Basis of Expense Distribution

Center #1: The entire cost of operating this center for Anti-Venin is applied to the monthly cost on the line "cost of doses." This is the simplest entry, credit "Expense," debit "In Process."

Center #2: In this center the accumulated expenses represent those incurred in receiving, maintaining, injecting and bleeding of all production animals and is distributed to the serum costs on the basis of animal days. For example: If there are 20 animals on Anti-Venin for 20 days; 30 for 15 days and 10 for 10 days, the total would be equivalent to one animal for 950 days. If there were 25 animals on Scarlet Fever for 30 days and 15 animals for

Anti Venin	JANUARY		FEBRUARY		MA	MBER	DECEMBER	
Unmixed Serum	Bulk Volume	Cost Value	Bulk Volume	Cost Value	Cost Value	Bulk Volume	Cost Value
Blood Drawn							
Plasma Obtained							
Horse Maintenance (Center #2)							
Loss thru Horse Deaths							
Cost of Doses							
Cost of Drawing Off							
Total Value of Plasma for Month							
Plasma on hand First of month							
Total Plasma							
New Average Cost per Liter							
Drawn for Mixing and Filtering							
Balance on Hand							
Serum in Process							
In process from previous Month							
Drawn for Mixing and Filtering							
Available Serum drawn for reworking							
Total W/P per Month							
Average Cost per Liter							
Plasma in process end of Month							
Plasma finished							
Loss in Filtration							
Amount Finished							
Cost of Mixing and Filtering							
Cost of Concentration							
Yield							
Average Cost per —							

Form 1.

10 days, the total would be equivalent to one for 900 days. Assuming that on the same basis we had animals on other treatments, (diphtheria, tetanus and pneumonia, etc.) equivalent to 2,150 days of maintenance, the distribution of center #2 expense would be made on a percentage basis arrived at as follows:

Animal Days	Percentage each is to the total
950 on Anti-Venin	23.75
900 on scarlet fever	22.50
2,150 on other serums	53.75
—— (itemized separately)	——
4,000	100.00%

The amount allocated is entered on the process sheet and the journal entry is credit "Expense" and debit "In Process."

Any horse that may die while on treatment is reported and a journal entry made, as a perpetual inventory record of all animals is kept. Entry:—credit "Inventory"—debit the cost of serum "In Process."

Center #3: This center is subdivided into three units and the expenses are incurred for the activities as follows:

A—The "drawing off" of the serum from the bleedings.

B—The mixing and filtration of serum.

C—The concentration of serum.

Daily work sheets showing volume worked and time spent on each of the serums are turned in by each unit and are used as the basis for the apportioning of the expense. The journal entry is the same as for center #1 and #2, credit "Expense" and debit "In Process."

Having made our entries on the process ledger sheet we have the costs allocated. Statistical reports of each kind of serum by volume are sent to the cost department by the laboratory office, a separate report for each serum. These give the monthly record of all items marked XX on Form I. This information makes our process sheet complete and the cost of the unmixed plasma is then determined. The material is placed in cold storage at 37° F with an inventory value as bulk stock. Journal entry, credit "In Process" and debit "Inventory." When drawn from cold storage for mixing, the entry is reversed. This is done because there is usually an elapsed time between the "drawing off" process and the refining of the serum.

The cost of the finished serum after refining is obtained from the cost allocation of center #3, B and C, and the statistical records of volumes and the journal entry is made.

The Packaging Process

There are two centers within the packaging department: 1: The filling room center, which has been described in the foregoing part of this paper, where the material is placed in containers under sterile conditions.

The "filled container" cost is a separate step in reaching the final package cost on account of tests made after filling which

FINISHING COST CARD

CODE # Biolog. 09-A

STYLE 10 cc Syringe

SPECIFICATION No. 1723

Quantity	ITEM	DATE @	$	DATE @	$	DATE @	$	DATE @	$
	Filling Supplies								
1000	glass syringes #64-1								
1000	plunger plug #6								
1000	red rubber stopper #15								
	per M								
	Finishing Supplies								
1000	metal capped cork								
1000	syringe labels								
1000	plunger rods 3¼"								
1000	finger rests #8								
1000	glass encased needle #57								
1000	wooden box #4								
1000	box wrappers								
1000	jap paper 4½ x 7⅝								
	% Loss on supplies								
	Finishing material cost per 1000								
	Packaging labor { Filling per 1000 / Finishing " 1000								
	Department # Biolog. Burden XYZ %								
	Total finishing cost per 1000 syr.	Unit Cost		Unit Cost		Unit Cost		Unit Cost	

FORM 2. 1591

C. O. 104

DUPLICATE NO._____ DELIVER NOT LATER THAN_____

DATE 8- 1-1933 CR. A/C._____ RX_____

_____ FIN. NO._____

ARTICLE Serum Anti Venin

POSTED BY_____ DRAWN BY_____ CHECK BY_____

AM'T DRAWN 1100 cc @ 0.00 PER Liter = 00.00

_____ @ _____ PER_____ =_____

_____ @ _____ PER_____ =_____

_____ @ _____ PER_____ =_____

SIZE	10cc Syr.				
QUANTITY	100				
SUPPLIES CODE NO	B-09-A				
BOTTLE ETC.					
CORK ETC					
CONTAINER					

BOTTLED BY._____ CHECKED BY._____

UNIT COST	SUPPLIES	0.00				
	LABOR	0.00				
	LAB. EXPENSE	0.00				
VALUE OF	SUPPLIES USED	0.00	)			
	LABOR	0.00	(			
	EXPENSE APP.	0.00	) 100 times the unit price			
	MATERIAL USED	0.00				
	TOTAL	✓				
ACTUAL UNIT COST		✓				
STANDARD UNIT COST		✓				
INVENT'Y ADJUSTM'TS		✓				

COST DEPT. STOCK CONTROL DEPT.

CHARGE_____ POST ON STOCK CARD-

FOR BREAKAGE_____ RETURNED TO STOCK; DUE TO

SHORTAGE_____ _____

SHARP & DOHME, PHILA., PA.

FORM 3.

1592

require seven days. At inventory periods it is necessary to have this figure for proper valuation. The records are controlled by a "filling number" and the cost is arrived at as follows:

The bulk cost being known, there is only the cost of container, the labor and departmental burden to be applied to get our cost of "filled container." The supplies used are standard and the workers are paid on a basis which makes the use of a factor possible. The burden rate is applied on the labor cost. This data is recorded on a standard Filling and Finishing Cost card as shown in Form II.

2: The Finishing center where the containers are labelled, assembled, wrapped and receive final inspection.

The finishing process is controlled by a requisition ticket issued in triplicate when minimum stock is reached. The duplicate copy serves as a cost summary sheet and is shown in Form III. The other two copies are used for laboratory records. The standard filling and finishing cost card shown is used for the unit factor.

The bulk material is supplied from the storage vaults and recorded on the requisition. The containers are filled and finished as outlined above and the necessary entries made. After having made the calculations, using the standard finishing cost card for unit cost factors, the data is posted to record cards, summarized and the usual journal entries are made.

This in brief outlines a method of finding serum costs which has been found sufficiently accurate for all practical purposes and is inexpensive to operate. The nature of the process is unusual in cost finding work in that living animals are manufacturing in their own bodies anti-toxins or anti-bodies by a process of nature responding to treatment by man. However the basic principles of cost finding have been adhered to, mixed with a modicum of common sense, which can never be left out of our calculations in any problem of business, especially in cost accounting.

APPLICATION OF DISTRIBUTION COSTS IN THE PHARMACEUTICAL INDUSTRY

By John N. Harvard, Secretary,
R. J. Strasenburgh Co., Pharmaceutical Chemists,
Rochester, N. Y.

THE method of taking average expenses and applying them to each item to establish a selling price is rather a difficult solution. For instance, from experience we find that our average expenses are as follows:

(These figures are somewhat fictitious.)

Cost of Merchandise	30%
Direct Selling Cost	25
Delivery Cost	10
Burden	25
Profit	10
Selling Price	100%

All of the following examples are based on average operating and distribution expenses and in stating costs per product the amount given includes all expenses delivered to the stock department.

Direct Selling Cost is remuneration to salesmen.

Delivery Costs include shipping packages, stock department expenses and transportation.

Burden includes office expenses, administration, sales promotion, advertising, etc.

If we apply the average to establish selling prices, we may be misled particularly on low cost tablets and in comparing tablets with fluids.

For instance, in comparing tablets which cost 42¢ and $1.20 per M respectively:

Cost per M	$0.42	$1.20
Direct selling	.35	1.00
Delivery	.14	.40
Burden	.35	1.00
Profit	.14	.40
	$1.40	$4.00

Here we have a case where 1 M tablets bears 14¢ of our delivery cost and in another case 40¢. It is very evident that in one case the delivery cost is underabsorbed and in the other overabsorbed.

This example is far more striking in fluids.

Cost of product	$1.05		$2.70
Direct selling cost	.88		2.25
Delivery expenses	.35		.90
Burden	.87		2.25
Profit	.35		.90
Selling Price	$3.50		$9.00

Here you will find that for delivery cost of the cheaper product we have allowed 35¢ per gallon which we all know is not sufficient and in another case 90¢ which is insufficient on a single gallon order.

The unit basis for distributing delivery and burden particularly, I believe is more satisfactory and in line with good accounting and for discussion I offer the following:

Single M quantities Delivery per M	25¢
In 5M quantities Delivery per M	15¢
Single gallon quantities Delivery per gallon	$1.00
Five gallon quantities Delivery per gallon	70¢

Burden is, of course, somewhat fixed on monetary values but, however, there is a minimum at which an order may be handled and the following are offered for consideration:

Minimum per M, 45¢.

Tablets selling over $2.50 per M, 20% of selling price.

Liquids—Minimum per gallon, 75¢.

Preparations selling over $4.00 per gallon 20% of selling price.

Applying the suggested figures we reach the following results:

Tablets cost per M	$0.42		$1.20
Direct selling	.44		.81
Delivery	.25		.25
Burden	.45		.64
Profit	.19		.34
Selling price	$1.75		$3.25

Liquids cost per gal...	$1.05	.....	$2.70
Direct selling	1.07	.....	2.05
Delivery expenses	1.00	.....	1.00
Burden	.75	.....	1.63
Profit	.43	.....	.82
Selling price	$4.30	.....	$8.20

In reviewing these figures you will find that an average experience application of selling and delivery costs on inexpensive tablets and liquids is not sufficient to absorb delivery and burden while the allowance is excessive on more expensive preparations. In one case based on the average theory we find that a tablet costing 42¢ per M and selling at $1.40 yields a profit of 10% and the unit basis (allowing 25% for delivery and 45¢ for burden) it would be necessary to have a selling price of $1.75 to yield a 10% profit. The more expensive product using the percentage basis to reach a selling price, we find that it would be necessary to sell for $4.20 per M to yield 10% profit and using the fixed distribution method we find that the same tablet could be sold at $3.25 per M and yield 10% profit.

In the liquids preparation costing $1.05 per gallon, applying average delivery and burden figures, we find they could be sold at $3.50 per gallon and yield 10% and with the other method it would be necessary to sell at $4.30 per gallon to show the proper profit. The preparation costing $2.70 per gallon using the first method would be sold at $9.00 and the second method $8.20.

In conclusion, I believe that the above figures show that small orders are handled at a loss, which is due to the method of arriving at selling prices.

SUGGESTED BIBLIOGRAPHY

DRUGS:

N. A. C. A. Publications:

Cost Analysis for Wholesale Operations with Special Reference to Wholesale Druggists. Vol. XII, No. 7.

Organization Studies in the Manufacturing Field. 1932 Year Book, pp. 82-84.

General:

A Manual of Uniform Cost Accounting. American Drug Manufacturers' Ass'n., 506 Albee Bldg., Washington, D. C. 1927. Supplement Issued 1933.

A Study of Drug Operating Costs. Northwest Pharmaceutical Bureau, University of Minnesota, Minneapolis, Minn. 1925.

Retailers' Expenses. Chamber of Commerce of the United States, Washington, D. C. Oct., 1930. 137 pp.

Operating Expenses in the Wholesale Drug Business. Harvard University, Bureau of Business Research, Cambridge, Mass. Aug., 1924. June, 1925.

Accounting Practice. Clarence M. Day. D. Appleton & Co., 35 W. 32nd Street, New York, N. Y. 1920. pp. 146-151.

Economic and Business Research in American Colleges and Universities. Business Research Council, 20 Vesey Street, New York, N. Y. 1932. 84 pp.

Cost Accounting for Druggists. National Wholesale Druggists' Ass'n., 51 Maiden Lane, New York, N. Y. Bulletins 1-13. June, 1929-1930.

SOAP:

N. A. C. A. Publication:

Cost Accounting in the Soap Industry. Volume III, No. 7.

General:

Operation of the Expense Budget in the Procter and Gamble Company. National Office Management Association, R. P. Brecht, Wharton School, University of Pennsylvania, Philadelphia, Pa. pp. 120-24. June, 1932.

Budget Estimates. Lever Bros. Company, Cambridge, Mass. 14 pp.

Problems in Industrial Accounting. Thomas H. Sanders. McGraw-Hill Book Company, 330 West 42nd Street, New York, N. Y. 1923. pp. 438-439.

OUR OPEN FORUM

The Federal Industrial Control Act has been the subject of a great deal of discussion and writing since its recent enactment, which has been directed to the most important part of the bill: "Title 1—Industrial Recovery."

The law is enacted for a period of two years (or less by Presidential proclamation or by joint resolution of Congress), but if it accomplishes the desired results, it is reasonable to assume that the law will be with us for a long time. At any rate, the taxation features may be with us longer than two years.

Under "Reemployment and Relief Taxes" there is enacted (Sec. 215) a "Capital Stock Tax" and (Sec. 216) an "Excess Profit Tax." The Capital Stock Tax is at the rate of $1 per $1,000 of "Adjusted declared value of its capital stock" and the Excess Profits Tax at the rate of 5% on income in excess of 12½% on the declared value of the capital stock.

In other words, each additional $1,000 of capital entitles the company to earn $125 without the payment of the Excess Profits Tax which otherwise would be taxed 5% or $6.25. It is obvious that if possible, it is advantageous to declare the stock at a value which will exempt the company from the Excess Profit Tax under normal conditions and thereby pay a tax at the rate of $1 instead of $6.25.

The two sections are very cleverly worded. Apparently some latitude is allowed in fixing the "declared value" the first year, but it cannot be amended, and for any subsequent year the same value must be used, adjusted for additional capital or surplus paid in; earnings or profits; (less) distribution of capital or earnings and operating deficits. If the capital is presently declared at a low value because of low earning and a year or two hence large profits are made the company is, figuratively speaking, "hung with its own rope."

Judging by the majority of affirmative answers to our Association's inquiry, "Should Plant Asset Values Be Reduced?", as reported in the March 15, 1933, Bulletin, many corporations may have placed themselves in a position of paying "Excess Profit Taxes" at the rate of $6.25 per $1,000 of capital instead of a Capital Stock Tax of $1 per $1,000 of capital.

In my reply to the questionnaire, I wrote at length and said in substance that I was opposed to arbitrarily writing down plant values to the basis of present "distress" conditions. I believe this new development in the tax situation confirms my position.

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